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10/667,339	09/23/2003	Shogo Hirose	117255	9283

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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/667,339

Applicant(s)

HIROSE ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2007.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) 13-15 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12 and 16-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 26 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All. b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on February 26, 2007 have been received and carefully considered. The changes made to the specification and drawings are acceptable. Claims 13-15 are withdrawn from consideration. Claims 18-20 are newly added. Claims 1-12 and 16-20 are under consideration.

Terminal Disclaimer

2. The terminal disclaimer filed on February 26, 2007 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 7,128,961 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-12 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, it is unclear as to where the specific end point of "at least 1:2" in the newly added limitation of "each slit having a width-to-length ratio of at least 1:2" (line 9) is supported in the originally filed disclosure. Applicant indicates that support is found in the

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preferred dimensions discussed in paragraph [0024] of the specification. However, the Examiner is unable to locate the specific end point of “at least 1:2”. It is further noted that this section of the specification suggests that the preferred dimensions are located outside of the claimed ratio. For instance, for a preferred slit width of 0.8 mm and a preferred slit length of 1 mm, the ratio would be approximately 1:1.25. Also, for a preferred slit width of 1 mm and a preferred slit length of 1 mm, the ratio would be approximately 1:1. Furthermore, the limitation of “at least 1:2” implies that there is no upper limit to the range. However, it is noted that section [0024] specifically sets maximums as well as minimums for the ratio, given that there exists an “upper limit” to the slit length and a “lower limit” to the slit width.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 8, 10-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higushi et al. (US 4,364,760) in view of Fujita (JP 59-199586) and Fleck (WO 93/21429).

Regarding claims 1 and 2, Higushi et al. (FIGs. 1-4; column 3, line 33 to column 4, line 11) discloses a honeycomb structure 1 comprising: a plurality of through channels 2 separated by porous partition walls 3 and extending in an axial direction of the honeycomb structure, wherein all of said through channels have plugging portions 4, respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern.

Higushi et al., however, is silent as to the provision of at least one slit per through channel 2, formed in the vicinity of the plugging portion 4 of the partition walls 3 surrounding the respective through channels, each slit having a width-to-length ratio of at least 1:2.

Fujita (FIGs. 1-7; Abstract) teaches a honeycomb structure comprising a plurality of through channels 1 separated by walls 2 extending in an axial direction of the honeycomb structure, wherein each through channel comprises at least one slit 3 having a width-to length ratio of at least 1:2 (see figures). Similarly, Fleck (FIG. 1; abstract; machine translation) teaches a honeycomb structure 1a comprising a plurality of through channels 2 provided with slits (i.e., interruptions in the walls 3 of the through channels), wherein the slits may be configured with a width-to-length ratio of at least 1:2 (being that the interruptions extend longitudinally either completely or part way through the honeycomb structure in the axial direction).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide at least one slit having a width-to-length ratio of at least 1:2 per through channel, formed in the vicinity of the plugging portion of the partition walls surrounding the respective through channels in the apparatus of Higushi et al., because the slits would improve the thermal shock resistance of the honeycomb structure, as taught by Fujita and Fleck.

Regarding claim 8, Fleck further teaches that the slit width may be varied from slit to slit

(see FIG. 8).

Regarding claim 10, Higushi et al. further discloses that the partition walls 3 have filterability (i.e., the structure 1 is a ceramic honeycomb filter; column 9, lines 25-37).

Regarding claim 11, Higushi et al. discloses that the sectional shape of the through channel 2 is one of triangular, quadrangular, hexagonal or circular (see column 2, lines 49-55).

Regarding claim 12, Higushi et al. discloses that the major crystal phase of the honeycomb structure is made of one of cordierite, silicon carbide, silicon nitride, alumina, mullite or LAS (column 2, lines 44-49; also see Example).

Regarding claim 18, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide an internal combustion engine in communication with the honeycomb structure 1, since Higushi et al. specifically discloses that the intended use of the honeycomb structure is as a ceramic honeycomb filter for removing fine soot particles from the exhaust gas of Diesel engines and other internal combustion engines (see column 9, lines 25-36).

5. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higushi et al. (US 4,364,760) in view of Fujita (JP 59-199586) and Fleck (WO 93/21429), as applied to claim 1 above, and further in view of Hidaka et al. (EP 1 128 031).

Regarding claims 3 and 4, Fujita (see abstract) further teaches that the slit may extend the entire length of the through channel, with a width of 10 microns or more. Also, Fleck teaches that the slits need not extend the entire length of the through channel (see machine translation). The collective teaching of Higushi et al., Fujita and Fleck, however, is silent as to a slit having the instantly claimed dimensions. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select suitable dimensions (such as the

instantly claimed dimensions) for the slits in the modified apparatus of Higushi et al., on the basis of suitability for the intended use thereof, because it has been held that changes in size merely involves routine skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Furthermore, Hidaka et al. is cited to illustrate that it is preferable to maintain the slit lengths within the claimed ranges, in order to provide mechanical strength to the honeycomb structure (see section [0053]).

Regarding claims 5-7, the collective teaching of Higushi et al., Fujita and Fleck is silent as to varying the slit length, such that the length of the slits in the vicinity of the outer peripheral portion of the honeycomb structure is longer than the length of the slits located in a central portion of the honeycomb structure. Hidaka et al. teaches a honeycomb structure wherein the length of the slits in the vicinity of the outer peripheral portion of the honeycomb structure is longer than the length of the slits located in a central portion of the honeycomb structure 1 (see section [0054]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the modified honeycomb structure of Higushi et al. such that the length of the slits in the vicinity of the outer peripheral portion of the honeycomb structure was longer than the length of the slits located in a central portion of the honeycomb structure, on the basis of suitability for the intended use thereof, because such a configuration enables the filtrate to be more efficiently discharged to the external space, as taught by Hidaka et al..

An increase in slit length is directly proportional to an increase in the slit open area. Although Hidaka et al. is silent as to teaching other means for increasing the slit open area (e.g., by increasing the number of slits at the outer periphery, or by increasing the width of the slits and

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the outer periphery), it would have been obvious for one of ordinary skill in the art at the time the invention was made to select other suitable means for increasing the slit open area in the modified honeycomb structure of Higushi et al., on the basis of suitability for the intended use thereof, because the substitution of known equivalent structures involves only ordinary skill in the art, and the substitution of known equivalent techniques, e.g., for enlarging the slit open area at the outer periphery, would have been obvious. *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank and Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950); *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higushi et al. (US 4,364,760) in view of Fujita (JP 59-199586) and Fleck (WO 93/21429), as applied to claim 1 above, and further in view of Rao et al. (US 5,758,496).

Higushi et al. is further silent as to the honeycomb structure 1 comprising an oxidation catalyst carried on at least in the vicinity of the slits. Rao et al. teaches the provision of an oxidation catalyst being on the porous partition walls of a ceramic honeycomb filter (column 4, lines 36-65). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide an oxidation catalyst at least in the vicinity of the slits in the modified apparatus of Higushi et al., on the basis of suitability for the intended use thereof, because the oxidation catalyst would promote the oxidation of the hydrocarbons and carbon monoxide byproducts of the combustion of fuel in a diesel engine, thereby reducing the emissions of noxious and undesirable exhaust gases, as taught by Rao et al.

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7. Claims 16, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwamoto et al. (US 5,853,459) in view of Tomita et al. (US 4,464,185).

Regarding claim 16, Kuwamoto et al. discloses an exhaust gas purification system comprising: a honeycomb structure (i.e., exhaust gas filter **15a**, **15b**, FIG. 3; wherein the filter is shown in detail in FIGs. 1, 2) comprising:

a plurality of through channels (i.e., through holes **3**) separated by porous partition walls (i.e., through hole diaphragms **2**) and extending in an axial direction of the honeycomb structure; wherein all of said through channels **3** have plugging portions (i.e., sealing portions **4**), respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern (see FIG. 2); and heating means (**17a**, **17b**; FIG. 3) for burning the particulate materials filtered by the honeycomb structure **15a,15b** to regenerate a filterability.

Kuwamoto et al. is silent as to the honeycomb structure comprising the instantly claimed honeycomb structure, including at least one slit per through channel formed in the vicinity of the plugging portion of the partition walls surrounding the respective through channels.

Tomita et al. (FIGs. 1, 2; column 2, line 42 to column 3, line 4) teaches a honeycomb structure **1** comprising a plurality of through channels (passages **2**, including inlet passages **21** and outlet passages **22**) separated by porous partition walls (separator walls **3**) and extending in an axial direction of the honeycomb structure **1**; wherein all of said through channels **2** have plugging portions (cover members **4**), respectively that plug alternately at either one end of the honeycomb structure (the upper end of to outlet passages **22**) or its opposite end (the lower end of inlet passages **21**) in a checkered flag pattern (see FIG. 1). Specifically, the honeycomb

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structure **1** comprises at least on slit (gas blowing pores **32**, FIG. 2) per through channel **2/21/22** is formed in the vicinity of the plugging portion **4** of the partition walls **3** surround the respective through channels **2/21/22**.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the honeycomb structure of Tomita et al. for the honeycomb structure in the system of Kuwamoto et al., on the basis of suitability for the intended use thereof, because the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Furthermore, a honeycomb structure **1** having slits **32** allows for carbon particulates in the exhaust gases to be effectively caught and collected, while the pressure loss occurring when the exhaust gases passes through the filter is reduced (column 1, lines 35-48; column 5, lines 32-36).

Regarding claim 17, the heating means **17a**, **17b** of Kuwamoto et al. meets the claim (see column 6, lines 48-53; column 9, lines 10-26).

Regarding claims 19 and 20, Kuwamoto et al. further discloses that an internal combustion engine (i.e., a diesel engine **6**; FIG. 3) is in communication with the honeycomb structure. Please note that expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Also, inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963).

Response to Arguments

8. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection, necessitated by amendment.

9. Applicant's arguments with respect to the rejection of claims 16 and 17 under 35 U.S.C. 103(a) as being unpatentable over Kuwamoto et al. (US 5,853,459) in view of Tomita et al. (US 4,464,185) have been fully considered but they are not persuasive. In response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which Applicant relies (i.e., each slit having a width-to-length ratio of at least 1:2) are not recited in either of claims 16 or 17. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JAL
Jennifer A. Leung
May 11, 2007


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